

In re MARK A. ROSS, Application No. 09/910,227
Amendment D

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Amendments to the Claims:

The listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claim 1 (previously presented): A method comprising:
generating an index by a content-addressable memory based on an input value;
acquiring a mask value and a data protection field based on the index;
generating a comparison value based on the mask value and the input value; and
comparing the comparison value to the data protection field in order to determine the integrity of a result of the content-addressable memory associated with the index.

Claim 2 (original): The method of claim 1, wherein the data protection field includes a pre-computed data protection result.

Claim 3 (original): The method of claim 1, wherein the content-addressable memory includes a ternary content-addressable memory.

Claim 4 (original): The method of claim 1, wherein said acquiring the mask value and the data protection field includes a lookup operation on a memory.

Claim 5 (original): The method of claim 1, wherein generating the comparison value includes:

masking the input value with the mask value to generate a masked input value; and
applying a data protection function to the masked input value to generate the comparison value.

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Claim 6 (original): The method of claim 1, wherein generating the comparison value includes:

- decoding the mask value to generate a decoded mask value;
- masking the input value with the decoded mask value to generate a masked input value; and
- applying a data protection function to the masked input value to generate the comparison value.

Claim 7 (previously presented): The method of claim 1, wherein generating the comparison value includes:

- masking the input value with the mask value to generate a masked input value; and
- applying a data protection function to the masked input value to generate the comparison value.

Claim 8 (original): The method of claim 1, wherein the input value has a plurality of input value bits, and the content-addressable memory includes a plurality of pairs of masks and values with each mask each having a plurality of mask bits and each value having a plurality of value bits; and

wherein said generating the index includes matching the input value with a particular one of the plurality of pairs of masks and values, wherein said matching includes comparing said input value bits whose corresponding said mask bits of the particular one of the plurality of pairs have a scalar value of one with said value bits of the particular one of the plurality of pairs whose corresponding said mask bits of the particular one of the plurality of pairs have a scalar value of one.

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Claim 9 (original): The method of claim 1, wherein the input value has a plurality of input value bits, and the content-addressable memory includes a plurality of pairs of masks and values with each mask each having a plurality of mask bits and each value having a plurality of value bits; and

wherein said generating the index includes matching the input value with a particular one of the plurality of pairs of masks and values, wherein said matching includes comparing said input value bits whose corresponding said mask bits of the particular one of the plurality of pairs have a scalar value of zero with said value bits of the particular one of the plurality of pairs whose corresponding said mask bits of the particular one of the plurality of pairs have a scalar value of zero.

Claim 10 (original): The method of claim 1, further comprising signaling an error condition if the comparison value is not equal to the data protection field.

Claim 11 (original): The method of claim 1, wherein said acquiring the mask value includes:

- retrieving an encoded mask value from a storage mechanism; and
- decoding the encoded mask value to generate the mask value.

Claim 12 (previously presented): A computer-readable medium containing computer-readable instructions for performing a set of steps, the set of steps comprising:

- retrieving a mask value and a data protection field from a storage based on an index value generated by a content-addressable memory based on an input value;

- masking the input value with the mask value to generate a masked input value;

- performing a data protection function on the masked input value to generate a comparison result; and

- comparing the comparison result with the data protection field in order to identify whether or not there was a data protection error.

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Claim 13 (original): The computer-readable medium of claim 12, wherein the storage includes one or more memory devices.

Claim 14 (original): The computer-readable medium of claim 12, wherein the storage includes one or more storage devices.

Claim 15 (original): The computer-readable medium of claim 12, wherein the content-addressable memory includes a ternary content-addressable memory.

Claim 16 (original): The computer-readable medium of claim 12, wherein the data protection field includes a pre-computed data protection result.

Claim 17 (original): The computer-readable medium of claim 12, further indicating an error condition if the comparison value is not equal to the data protection field.

Claim 18 (previously presented): An apparatus comprising:
a content-addressable memory configured to receive an input word and to generate an index;

one or more storage mechanisms coupled to the content-addressable memory to receive the index and to produce a mask value and a data protection field;

a masking device coupled to said one or more storage mechanisms to generate a masked result based on the input word and the mask value;

a data protection generator coupled to the masking device to generate a comparison value based on the masked result; and

a comparison mechanism coupled to the data protection generator and said one or more storage mechanisms to compare the comparison value and the data protection field in order to identify whether or not there was a data protection error.

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Claim 19 (original): The apparatus of claim 18, wherein the masking device includes a decoder to decode the mask value.

Claim 20 (original): The apparatus of claim 18, wherein the comparison mechanism indicates an error condition if the comparison value is not equal to the data protection field.

Claim 21 (original): The apparatus of claim 18, wherein the data protection field includes a pre-computed data protection result.

Claim 22 (original): The apparatus of claim 18, wherein the content-addressable memory includes a ternary content-addressable memory.

Claim 23 (previously presented): An apparatus comprising:
a content-addressable memory including a plurality of entries, each of the plurality of entries including a value and a data protection field, wherein the content-addressable memory is configured to identify one of the plurality of entries in response to a look operation on an input word;
a data protection generator, coupled to the content-addressable memory, to receive said value of said identified one of the plurality of entries and to generate a comparison value; and
a comparison mechanism, coupled to the data protection generator and the content-addressable memory, configured to compare the comparison value and said data protection field of the identified one of the plurality of entries in order to identify whether or not there was a data protection error.

Claim 24 (original): The apparatus of claim 23, wherein the content-addressable memory includes a binary content-addressable memory.

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Claim 25 (original): The apparatus of claim 23, wherein, for each of the plurality of entries, said data protection field of a particular entry includes a pre-computed data protection result for said value of the particular entry.

Claim 26 (previously presented): A method comprising:
receiving a content-addressable memory index generated based on a lookup operation in a content-addressable memory on an input word, the content-addressable memory index including a value field and a data protection field;
extracting the value field and the data protection field from the content-addressable memory index;
performing a data protection function on the value field to generate a comparison result; and
comparing the comparison result with the data protection field in order to identify whether or not there was a data protection error.

Claim 27 (original): The method of claim 26, wherein the content-addressable memory includes a binary content-addressable memory.

Claim 28 (original): The method of claim 26, wherein the data protection field includes a pre-computed data protection result.

Claim 29 (original): The method of claim 26, further indicating an error condition if the comparison result is not equal to the data protection field.

Claim 30 (canceled)

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Claim 31 (previously presented): An apparatus comprising:

a content-addressable memory configured to receive an input word and to generate an index;

a memory, coupled to the content-addressable memory and a comparison mechanism, to receive at least a first portion of the index generated by the content-addressable memory and to retrieve a data protection field from a location identified based on the index;

a data protection generator, coupled to the content-addressable memory and the comparison mechanism, configured to receive at least a second portion of the index generated by the content-addressable memory and to generate a comparison value based on the index; and

the comparison mechanism configured to compare the comparison value generated by the data protection generator and the data protection field retrieved from the memory in order to identify whether or not there was a data protection error.

Claim 32 (original): The apparatus of claim 31, wherein the content-addressable memory includes a binary content-addressable memory.

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Claim 33 (previously presented): A method comprising:
generating an index by a content-addressable memory based on an input value, the index identifying a matching entry of the content-addressable memory;
generating a comparison value by a data protection generator based at least on a portion of the index received from the content-addressable memory;
acquiring a data protection field from a memory, the data protection field being retrieved from an address based at least on a portion of the index received from the content-addressable memory; and
comparing the comparison value generated by the data protection generator to the data protection field acquired from the memory to identify whether or not an error exists.

Claim 34 (original): The method of claim 33, wherein the data protection field includes a pre-computed data protection result.

Claim 35 (original): The method of claim 33, wherein the content-addressable memory includes a binary content-addressable memory.

Claim 36 (original): The method of claim 33, wherein said acquiring the data protection field includes a lookup operation on a memory.

Claim 37 (original): The method of claim 33, wherein generating the comparison value includes applying a data protection function to the index.

Claim 38 (original): The method of claim 33, further comprising signaling an error condition if the comparison value is not equal to the data protection field.

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Claim 39 (previously presented): An apparatus comprising:
means for generating an index by a content-addressable memory based on an input value;
means for acquiring a mask value and a data protection field based on the index;
means for generating a comparison value based on the mask value and the input value;
and
means for comparing the comparison value to the data protection field in order to identify whether or not an error exists.

Claim 40 (original): The apparatus of claim 39, wherein the data protection field includes a pre-computed data protection result.

Claim 41 (original): The apparatus of claim 39, wherein the content-addressable memory includes a ternary content-addressable memory.

Claim 42 (original): The apparatus of claim 39, wherein said means for acquiring the mask value and the data protection field includes means for performing a lookup operation on a memory.

Claim 43 (original): The apparatus of claim 39, wherein said means for generating the comparison value includes:
means for masking the input value with the mask value to generate a masked input value; and
means for applying a data protection function to the masked input value to generate the comparison value.

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Claim 44 (original): The apparatus of claim 39, wherein said means for generating the comparison value includes:

- means for decoding the mask value to generate a decoded mask value;
- means for masking the input value with the decoded mask value to generate a masked input value; and
- means for applying a data protection function to the masked input value to generate the comparison value.

Claim 45 (original): The apparatus of claim 39, further comprising means for signaling an error condition if the comparison value is not equal to the data protection field.

Claim 46 (previously presented): An apparatus comprising:

- means for receiving an input word and for generating an index;
- means for receiving the index and for producing a mask value and a data protection field;
- means for generating a masked result based on the input word and the mask value;
- means for generating a comparison value based on the masked result; and
- means for comparing the comparison value and the data protection field in order to identify whether or not an error exists.

Claim 47 (original): The apparatus of claim 46, wherein said means for generating a masked result includes means for decoding the mask value.

Claim 48 (original): The apparatus of claim 46, wherein said means for comparing includes means for indicating an error condition if the comparison value is not equal to the data protection field.

Claim 49 (original): The apparatus of claim 46, wherein the data protection field includes a pre-computed data protection result.

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Claim 50 (original): The apparatus of claim 46, wherein said means for receiving the input word and for generating the index includes a content-addressable memory.

Claim 51 (original): The apparatus of claim 46, wherein said means for receiving the input word and for generating the index includes a ternary content-addressable memory.

Claim 52 (previously presented): An apparatus comprising:
means for receiving an index and for producing a value and a data protection field based on the index;
means for generating a comparison value based on the value; and
means for comparing the comparison value to the data protection field in order to identify whether or not an error exists.

Claim 53 (original): The apparatus of claim 52, wherein said means for receiving the index and for producing the value and the data protection field includes a binary content-addressable memory.

Claim 54 (original): The apparatus of claim 52, wherein the data protection field includes a pre-computed data protection result for the value.

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Claim 55 (previously presented): An apparatus comprising:
means for generating an index based on an input value to a content-addressable memory identifying a matching entry of the content-addressable memory;
means for generating a comparison value based on the index received from the content-addressable memory;
means for acquiring a data protection field from a memory based on the index received from the content-addressable memory; and
means for comparing the comparison value generated by said means for generating the comparison value to the data protection field acquired by said means for acquiring the data protection field in order to identify whether or not an error exists.

Claim 56 (original): The apparatus of claim 55, wherein said means for generating the index based on the input value includes a binary content-addressable memory.

Claim 57 (original): The apparatus of claim 55, wherein said means for acquiring the data protection field includes means for performing lookup operation on a memory.

Claim 58 (original): The apparatus of claim 55, further comprising means for signaling an error condition if the comparison value is not equal to the data protection field.

Claim 59 (previously presented): A computer-readable medium containing computer-executable instructions for performing operations, said operations comprising:
receiving a content-addressable memory index;
extracting a value field and a data protection field from the content-addressable memory index;
performing a data protection function on the value to generate a comparison result; and
comparing the comparison result with the data protection field in order to identify whether or not an error exists.

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Claim 60 (previously presented): The computer-readable medium of claim 59, wherein the content-addressable memory includes a binary content-addressable memory.

Claim 61 (previously presented): The computer-readable medium of claim 59, wherein the data protection field includes a pre-computed data protection result.

Claim 62 (previously presented): The computer-readable medium of claim 59, further indicating an error condition if the comparison result is not equal to the data protection field.

Claim 63 (previously presented): The method of claim 1, wherein the index includes an identification of a position of an entry in the content-addressable memory matching the input value.

Claim 64 (previously presented): The computer-readable medium of claim 12, wherein the index value includes an identification of a position of an entry in the content-addressable memory matching the input value.

Claim 65 (previously presented): The apparatus of claim 18, wherein the index includes an identification of a position of an entry in the content-addressable memory matching the input value.

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Claim 66 (new): An apparatus comprising:

a content-addressable memory configured to receive an input word and to perform a content-addressable memory lookup operation in order to generate a data result for the input word, the data result including a value and a data protection field of an entry in the content-addressable memory matching the input value;

a data protection generator, coupled to the content-addressable memory, configured to generate a comparison data protection value based on the value; and

a comparison mechanism, coupled to both of the data protection generator and the content-addressable memory, configured to compare the comparison data protection value and the data protection field in order to identify whether or not there was a data protection error for said content-addressable memory lookup operation.

Claim 67 (new): The apparatus of claim 66, wherein the comparison mechanism indicates an error condition if the comparison data protection value is not equal to the data protection field.